October 25, 2002

**Commentary by the California Independent System Operator Corporation on the CPUC Staff Investigative Report on Wholesale Electric Generation, released September 17, 2002**

Executive Summary

Senator Dunn has asked the ISO to comment on the CPUC Staff Investigative Report on Wholesale Electric Generation (the "CPUC Staff Report"), in particular, any specific critiques the ISO may have of the findings and methodology employed. Senator Dunn also requested the ISO to explain its understanding of comments made by a Duke spokesman about the CPUC Staff Report, which suggested that any failure by Duke's California facilities to generate from available capacity resulted from ISO's purported "control" of the capacity in question.

The CPUC Staff Report analyzes a question of critical importance to the State of California: whether generation capacity was withheld during the power crisis of 2000-2001 and, if so, how a repeat of any such circumstances can be avoided in the future. The Report relates the events and circumstances of the crisis, which seriously impacted the ISO Controlled Grid and the ability of the ISO to maintain a reliable electricity supply. The ISO agrees with the CPUC Staff Report that generators did not bid their capacity into the ISO's markets, which forced the ISO to find and procure resources in real time in order to serve and balance the system. These problems were compounded when, as the Report explains, the ISO encountered circumstances where generators declined to provide generation for a variety of inappropriate reasons.

It is more difficult to comment on the effort in the CPUC Staff Report to quantify withholding by the five largest generators, because the underlying analysis is not available to the ISO. The methodology described in the Report, however, does not specifically mention a number of factors that would be relevant to calculating available capacity. To the extent those factors are not incorporated in the conclusions expressed in the Report, the Report's quantitative conclusions may not be accurate. Moreover, even if these factors were accounted for adequately, the quantitative analysis would not answer the critical question of whether any given blackout or load curtailment was avoidable. This is because the Report's analysis focuses exclusively on an after-the-fact computation of the generation "available" during the hours in which load was curtailed. Any decision to curtail load had to be made before that time, on the basis of projections and other information that the Report does not address.

In response to Senator Dunn's question regarding assertions made by Duke, this commentary explains that the fact that generating units within the California grid are subject to Emergency Dispatch authority does not mean that the ISO is "in control of uninstructed power during the dates and times identified in the PUC report." Although the ISO can direct a plant to run, in real time the ISO cannot force any plant to run. Nor did RMR contracts confer such authority on the ISO to address system-wide emergencies.

## Introduction

The Staff Report expresses its statistical conclusions in a manner that precludes ready comparison with ISO data, because it omits any conclusions about the status of individual generating units during particular hours. In other words, the Report's conclusions from its statistical analysis are stated in terms of capacity available to each of the "big five" generation owners in the aggregate, rather than at each individual generating facility (i.e., the unit level, for which ISO data would be available for comparison). Consequently, despite the Staff Report's narrative description of the methodology, it is not possible to determine precisely how the methodology was applied, and thus the ISO is limited in the level of detail that it can provide by way of response to the Committee. To date, the ISO has been unable to conclude arrangements to obtain the CPUC's data or additional information about its methods.[1] The ISO can, however, comment on some specifics within the Staff Report and respond to some of the comments on the Report offered by Duke.

### A. Comments on the Conclusions and Methodology of the CPUC Staff Report

While questions regarding the methodology of the CPUC Staff Report are outlined below, those questions do not undermine the importance of the inquiry that the CPUC has undertaken. Determining whether generation was withheld and, if so, how a repeat of any such circumstances can be avoided in the future, is of critical importance to the State.[2]

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[1] While the CPUC states that it used data received from the ISO, it also acknowledges use of documents and data from the Generators, the California Power Exchange and the California Department of Water Resources, to which the ISO does not have access.

[2] Like the CPUC, the ISO has been raising questions about the possible physical withholding of capacity since the fall of 2000. For example:

- The ISO investigated a series of RMR unit outages during the spring of 2000, which forced the ISO to call non-RMR units out-of-sequence to meet local reliability requirements at prices equal to the maximum bid cap in effect at that time ($750). This issue was referred to FERC, which ultimately issued a Show Cause Order and reached a Settlement Agreement in the spring of 2001 under which over $8 million was refunded by Williams Energy.
- ISO staff inspected 8 generating plants during November and December 2000 in conjunction with CPUC and FERC staff.
- In early December 2000, FERC accepted ISO's proposed Tariff Amendment 33, which established penalties for generators who failed to respond to ISO dispatch instructions during system emergencies (discussed further below).
- On December 13, 2000, the ISO sought and obtained an emergency order from the U.S. Secretary of Energy compelling in-state and out-of-state suppliers to offer available capacity to the California markets. ISO's request was granted in a series of orders beginning on December 14, 2000 and continuing until February 6, 2001.
- Upon expiration of DOE order, the ISO filed a lawsuit in Federal court against certain suppliers who indicated that they would not comply with emergency dispatch instructions issued by the ISO. The Federal District Court issued a temporary restraining order and a preliminary injunction compelling generator compliance with dispatch instructions, as discussed further below.

1. Points of Agreement With the CPUC Staff Report

The CPUC Staff Report lays out a series of behaviors exhibited by California Generators in the months under study, behaviors which the ISO witnessed. The Report accurately presents such events and circumstances, which seriously impacted the ISO Controlled Grid and the ability of the ISO to maintain a reliable electricity supply, and which included:

- Generators failed to follow dispatch instructions during system emergencies; some of those refusals were premised (as the Report also correctly notes) on different views of the applicable legal requirements. Nonetheless, failure to follow a dispatch instruction during a system emergency imperils the system and the provision of reliable electrical service to the State.

- The ISO, with the CPUC and on its own, has inspected plants where questions have arisen as to whether an outage was legitimate. Those inspections were inconclusive and, in the ISO's experience, on-site inspections alone are typically not sufficient to determine the validity of an outage. Additional information, such as plant logs, operating records and interviews with plant staff, are often needed to verify outage declarations. Unlike the CPUC and FERC, the ISO does not have the authority to compel generators to provide such information.

- Generators declined Automatic Dispatch System (ADS) Instructions, citing "economic considerations." The ISO agrees that this conduct occurred on numerous occasions and that it was not acceptable.

- The CPUC Staff Report correctly concludes that generators did not bid their capacity into the ISO's markets, forcing the ISO, hour upon hour, to find and procure resources in real time in order to balance the system.

- As the Report also notes, the ISO encountered circumstances where generators refused to run, citing lack of operating personnel, or argued with ISO operators over the prices at which they would run. Such conduct is unacceptable, particularly during system emergencies.

2. Comments on the Methodology Used in the CPUC Staff Report

The question of whether California in-state Generators withheld power that, if provided, would have avoided the need to curtail electricity customers (as the CPUC concludes) needs, initially, to be asked as two questions. The first question, whether generation was available, must be addressed on a unit-specific level to provide an accurate, after-the-fact count of megawatts of available unloaded generation capacity. For example (and to address one of the

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In March 2001, the ISO provided to FERC empirical evidence supporting the existence of strategic bidding behavior in the ISO real-time markets during the May-November 2000 time period. The report concluded that suppliers increased prices by bidding above costs (which amounts to “economic withholding” in a single price auction) and by not bidding all available capacity (“physical withholding”).

questions regarding Duke's response), the CPUC Staff Report concludes that during hours involving service interruptions on May 8, 2001, Duke had on average "over 800 megawatts available and unused." (CPUC Staff Report at 24.) Duke disputes this conclusion, stating in the attachment to its September 26 letter to President Lynch, that "[i]t appears that the CPUC did not reflect that Morro Bay Unit 3 was in a prescheduled overhaul outage." The CPUC Staff Report does not indicate whether, in fact, it was counting Morro Bay Unit 3 as in or out of service. However, it is correct that Duke reported to the ISO that the unit was out of service, as reported that day on the ISO's website. See Non-Operational Generating Units – available at www.caiso.com/SystemStatus.html.[3] In addition, the ISO agrees with Duke's graphic depiction of the generating status of the identified units during these hours of May 8 – i.e., that essentially all of Duke's capacity was either providing generation or regulation capacity or was unavailable due to outages that had been previously communicated to the ISO.

With respect to this first question – identifying available generation – the CPUC Staff Report describes its methodology in general terms. Although the CPUC Staff Report was based on data from the ISO (among other sources), the ISO was not consulted with respect to how to approach a calculation of capacity that may have been available. Without reviewing and studying the underlying analysis, which is not available, the ISO is not able to determine how the variables identified in the Report were applied. It is clear, however, that there are numerous factors not specifically mentioned by the CPUC that would be relevant to calculating available capacity. Examples include:

- The production or available capacity of a unit during any given hourly increment can be limited by a number of operating constraints, such as minimum unit down times, start-up times and ramp rates.

- Similarly, the maximum capacity of generating units (or its "P_MAX" value recorded in ISO databases) of a unit is a measure of its capacity under test conditions that reflects optimal operating and equipment status; the test is conducted as part of an ISO certification process, the successful completion of which certifies a unit to provide ancillary services through the ISO's markets. The operating capacity of a unit at any given point in time may vary depending on temperature (i.e., ambient, equipment or cooling water), operating and plant or environmental conditions, even where the plant is not experiencing a formal "derate" due to a specific, physical problem. Thus, to determine available capacity, one must consider whether it is appropriate to employ assumptions that certain units generating close to their P_MAX in fact have no available capacity.

- After an outage, unit start up times vary widely, but can be as much as 72 hours or longer, during which time the unit must be run at low output (e.g., supplying plant auxiliary equipment power only) to warm up and synchronize to the grid. During this start up period, the unit would not be listed among outages, but it would not necessarily have been able to produce electricity for dispatch, in which case one

[3] Issues respecting the outage data which the CPUC Staff Report may have used are discussed below.

would assume it would not have had bids submitted nor would it have been dispatched by the ISO during the start-up period.

- The transmission constraints on Path 15 that may limit use of power available in Southern California to serve load in Northern California (and vice versa) have been well publicized. However, there are many other transmission constraints within the ISO controlled grid that impact the degree to which generation within any specific zone can be utilized to meet overall system loads. Thus, capacity may be bid into the ISO markets (or otherwise available) but not dispatched because of locational transmission constraints.

- The CPUC Staff Report appears to have relied on outage data files that the ISO specifically warned may not be reliable. The warning, which applied to the ISO's reproduction (in a form convenient for data analysis) of hourly outage data prior to January 1, 2001, was provided to numerous persons including the CPUC's expert consultant, Robert McCullough, in an April 3, 2001 letter.

- The CPUC Staff Report appears to make assumptions about ISO outage data that are inconsistent with actual market operation. The ISO does not "assume[] a plant to be out-of-service for an entire hour even if the plant is only out-of-service for a few minutes during that hour." In addition, it is not clear whether the Report accounted for all outage entries in the ISO's SLIC database, including narrative text entries describing outages and "derates."

- Further, the CPUC may have used outage data that was useful for depicting outages on a macro level but which was not appropriate for investigation of unit-specific behavior during a specific subset of hours. The ISO brought this data limitation to the CPUC's attention in several conversations and in at least one written exchange in July 2002.[4]

- The ISO is also aware that natural gas supplies were curtailed to certain generators in the San Diego area during November 2000, as well as January and February 2001. Some of those generators switched their units from natural gas to oil or another alternative fuel, a switchover that required, at the least, reducing output of the unit to its minimum or near minimum, or at most, bringing the plant off line entirely. Due to the combustion temperature of the fuel or the efficiency of the fuel system, the type of fuel being used in and of itself could cause fuel-based limitations on the output of the unit or the plant. This limitation would not be listed as an outage. It is not clear whether such limitations are reflected in the CPUC Staff Report's conclusions.

- If the unit has sold "Regulation" capacity (used to fine tune the balance of supply and demand in real-time, discussed further below) such that a specific amount of

[4] As noted above, CPUC Staff, in discussing data issues with the ISO, did not explain to the ISO why it was looking at the outage data or that it was using such data to quantify "available" generation.

capacity is placed under the ISO's Automatic Generation Control ("AGC"), any calculation of capacity that is available but not generating (or otherwise committed as capacity) must be adjusted to account for AGC operating limits. Depending on the question being asked, using P_MAX may overstate the amount of available generation.

- The ISO, as the Control Area Operator, is obligated by the Western Electricity Coordinating Council ("WECC") Minimum Operating Reliability Criteria ("MORC") to maintain a certain minimum level of operating reserves. At least fifty percent of this reserve must be synchronized to the grid and available within ten minutes. Due to the fact that the ISO Control Area is, with respect to total system load and control of generation, among the largest and most electrically influential in the Western Interconnection, careful maintenance of the reserve is essential to the integrity of the ISO Control Area and the Western Interconnection. It is not clear whether the CPUC Staff Report fully accounts for the minimum amount of spinning reserve that must remain available – including reserve that might be available out of market – in order for the ISO to fulfill this obligation given real time conditions and trends.

- It is not clear whether the CPUC properly accounts for "Regulation Down" energy. In order to conduct the constant fine-tuning of the system necessary to maintain the balance of supply and demand in real-time, which impacts Western Interconnection frequency, the ISO purchases from generators two "Regulation" products called "Regulation Up" and "Regulation Down" (also known as "Reg Up" and "Reg Down"). A generator that successfully bids to provide Reg Down, commits to decrease its generation in response to an automatic dispatch by the ISO through its AGC. This system, through automated commands to generators who have successfully bid to provide Reg Up or Reg Down, moves the unit up or down to balance supply and demand in the Control Area and to meet the ISO's obligation, based on the Control Area frequency response characteristic (i.e., the Control Area's typical response to an interconnected system disturbance) to contribute to the maintenance of interconnection frequency. It is not clear how the CPUC Staff Report accounts for Regulation Down (i.e., energy not supplied in order to balance the system), but it should not be counted as withholding. For example, during Hour 15 on May 8, 2001, the ISO accepted Duke's bid for Reg Down energy in order to balance the system.[5] Although Duke was otherwise generating at full capacity (according to ISO records), the CPUC Staff Report states that Duke withheld substantial capacity during this hour. To the extent this

[5] Although it may initially seem counter-intuitive, system emergencies can necessitate the use of Regulation Down to balance supply and demand. Regulation Down may be required after load is curtailed or shed (users are dropped from the system), to correct any temporary imbalance that was caused by dropping load, the precise effects of which are difficult to predict in advance. On May 8, 2001 (the date discussed by Duke), Regulation Down was also necessary to balance the effect of electricity that was imported into California during curtailment hours. The net effect of the import and the offsetting Regulation Down instruction was to enhance the ISO's overall capacity for regulation – i.e., to enable it to respond quickly to demands for additional generation by canceling the Regulation Down instruction.

conclusion was drawn without regard to Duke's Reg Down energy, it would be erroneous.

A fully accurate count of available megawatts does not, however, answer the second part of the CPUC's question, which is: Had that electricity been available, would any particular service interruption have been avoided? This question cannot be answered by reviewing – after the fact – the actual number of megawatts available during hours of curtailment, because the critical operating decisions, including any decision to curtail load (including how much), must be made on the basis of such information as is available before the curtailment hour and in real-time. These decisions are based on forecasts for the coming hours – forecasts of available generation, load, reserves, imports, and the uncertain effects of the announcement of a Stage 3 emergency or an imminent curtailment real time operating conditions and anticipation of near-term operating conditions based on available information,[6] all of which are performed on an extremely dynamic, interconnected and interdependent electrical system. Any decision to curtail load must also take into account the accuracy of the telemetry data, which itself depends on accuracy of individual unit measurements. In other words, even assuming a perfectly precise methodology applied to completely accurate data, the resulting after-the-fact calculation of available capacity would not answer the ultimate question of whether a curtailment or service interruption could have been avoided had more of the "available" capacity been produced. Nonetheless, the work presented in the CPUC Staff Report towards developing an understanding of what capacity was available and why it was not produced furthers the critical task of avoiding in the future the circumstances experienced in 2000-2001.

B. Comments on Duke's Letter to President Lynch

The Senate Select Committee also asked the ISO, based on comments made by Duke, whether "the ISO was in 'control' of uninstructed power during the dates and time identified in the PUC report." Duke's letter to President Lynch confuses the authority to instruct a generator to act with the physical ability to compel action in accordance with the instruction. As an example, Duke states: "The report assumes that if Duke Energy did not bid power into the market, then the ISO could not dispatch Duke Energy's units. In fact, the CAISO has the authority to order production from in-state private generators, and did so on numerous occasions." (Duke Energy Letter to President Lynch, dated September 26, 2002.) That statement is correct, as far as it goes; the ISO does have certain authority based on contract and Tariff; it does not, however, have control, as discussed further below.[7]

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[6] The ISO observed that when a Stage 3 emergency or imminent load curtailment was announced, users would voluntarily shut down power. For example, if ISO announced that it was necessary to shed 500 megawatts, a few hundred additional megawatts might voluntarily drop from the system.

[7] In the just-quoted statement from its letter to President Lynch, Duke also implies that if it or any generator did not bid into the market, there should have been no problem because ISO could simply issue a dispatch instruction for power from the available capacity. But this sidesteps the issue about failure to bid in the first place. Prior to June 2001 there was no requirement that, during system emergencies, generators bid all available power. However, on each of the 38 days reviewed by the CPUC (and many others between November 2000 and May 2001), the ISO was in a system Alert or Warning condition, and/or had declared a Stage 1, 2 or 3 electrical emergency. Those alerts and emergencies were publicized with real time electronic notices to all Market Participants warning that:

1. The ISO's Emergency Dispatch Authority is Not Enforceable in Real Time

During system emergencies and when the ISO considers that such an emergency is imminent or threatened, the ISO has the authority to "instruct a Participating Generator to bring its Generating Unit on-line, off-line, or increase or decrease the output of the Generating Unit … if such an instruction is reasonably necessary to prevent an imminent or threatened System Emergency or to retain Operational Control …." Thus, if a generator has available capacity that has not been bid into the market and if the generator's unit is on line and not subject to physical or legal (usually environmental) operating constraints, then the ISO can issue an emergency dispatch instruction and the generator should perform. But the ISO cannot control that generator's decision whether to perform. Even after the penalty provisions of Tariff § 5.6.3 were added in December 2000 in Tariff Amendment 33, refusals to follow dispatch instructions occurred with great frequency.

As the CPUC Staff Report accurately details, generators routinely ignored these instructions throughout the time period under study; a variety of rationales were offered. In some cases, units were declared out for technical reasons after being dispatched by the ISO. In addition to the incidents reported by the CPUC, we offer the following as illustrative:

- After PG&E and Edison defaulted on debts owed to the ISO markets, a generator told the ISO that, absent an order from the U.S. Department of Energy, it would not respond to emergency dispatch instructions and believed that the ISO's power to issue such instructions at all was void if the generator did not receive prior assurances that a creditworthy counterparty would pay for the energy. The ISO filed suit in February 2001, asking the U.S. District Court for an injunction requiring the generator to comply with the ISO's emergency dispatch instructions. The Court issued a temporary restraining order, followed by a preliminary injunction, at which point the generator appealed. The Ninth Circuit issued a preliminary ruling, questioning whether any entity other than the Federal Energy Regulatory Commission could enforce the terms and conditions of the ISO Tariff. Shortly after that ruling, FERC made additional orders regarding the credit provisions of the Tariff that mooted the appeal; FERC also ordered, however, on June 13, 2001, that concern about credit backing did not "excuse suppliers from complying with ISO emergency dispatch orders …."

- Generators claimed that their units could not run due to air emissions restrictions. Sometimes actual restrictions did exist. In other instances, it appeared that the restrictions may have been feigned. Throughout winter 2000-2001, the ISO worked closely with regulatory authorities to ensure that air emissions issues were

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> the ISO is predicting deficiencies in Operating Reserve …. The ISO is issuing a "Warning" notice and is requesting additional Supplemental Energy bids during this period.

(Emphasis added.) Thus, generators had detailed, real time knowledge of projected system shortfalls and that their capacity was needed in the form bids into the Supplemental (real time) Energy markets.

appropriately addressed while ensuring that capacity was made available to serve California's population.

- Despite the imposition of Amendment 33 penalties, dispatch instructions were frequently not followed.

More examples could be cited. It is sufficient to say that the Tariff grant authority to dispatch generators, even with an economic sanction attached, does not provide ISO with the "control" over generating units in system emergencies.[8]

2. RMR Contracts Do Not Provide the ISO with Physical "Control" of a Plant's Output

Duke also suggests that the ISO had certain Duke generating units under its "control" by virtue of Reliability Must Run ("RMR") Contracts. This again confuses a legal right with physical ability to compel performance. The ISO enters into RMR contracts with generators in order to have the ability to dispatch energy from certain generating units at cost-based rates as needed to ensure local reliability, and in order to prevent generators who know their units are needed for local reliability from exercising market power. For example, an RMR contract between the ISO and Duke covering a unit in Oakland provides that Duke will respond when the ISO dispatches the plant and otherwise cannot bid the capacity from that unit into the market. But the contract also provides that the plant can be dispatched

> **solely** for the purposes of meeting **local** reliability needs or managing intra-zonal congestion. … [L]ocal reliability needs do not include Energy required to manage inter-zonal congestion. … ISO may not issue a Dispatch Notice to fill a need for imbalance [i.e., real time] energy.

RMR Pro Forma Agreement, § 4.1(b) (emphasis added).[9] The ISO could not order the plant to run under the RMR contract where local reliability was not at risk. Moreover, the RMR contract prohibits the ISO from dispatching RMR units if such dispatch would cause the unit to violate an environmental regulation or operating permit. The Duke Oakland plant consists of jet turbine engines that are very expensive to run and, because they produce large quantities of air emissions, can only run a specified number of hours per year in accordance with their air emission permits. Thus, the fact that these and other units within the California grid are subject to RMR contracts does not mean that the ISO was "in control of uninstructed power during the dates and times identified in the PUC report." Nor does it mean that the ISO could force a plant to run in real time pursuant to an RMR contract.

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[8] The ISO does physically control generators who have successfully bid to provide "Regulation" capacity. As noted above in Section A.2, units which successfully bid to provide Regulation should not be counted as withholding.

[9] An RMR plant can also, in the event of a system emergency, be given emergency dispatch instructions outside of the ISO Markets (Tariff § 5.6.1). Most RMR plants (and the Duke Oakland facility would be such an example) are subject to environmental laws and other constraints limiting the number of hours per year they can operate.

The ISO hopes the Committee finds these comments helpful and remains ready to continue supporting the Committee's and CPUC's work.